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# State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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August 23, 1999

Kenneth E. May, General Manager
Canyon Fuel Company, LLC
SUFCO Mine
397 South 8th West
Salina, Utah 84564

Re: Remaining Deficiencies in 150 Acre Incidental Boundary Change, Canyon Fuel Company, LLC, SUFCO Mine, ACT/041/002-IBC98-2, Folder #2, Sevier County, Utah

Dear Mr. May:

Our review of your application for a 150 acre Incidental Boundary Change (IBC) at the SUFCO Mine, has determined that some progress has been made but your application still contains some deficiencies. These will need to be corrected before we can approve the application. A partial Technical Analysis (TA) has been enclosed which discusses the issues that still need to be resolved.

In order for us to keep this in our review process we will expect a response correcting the deficiencies by no later than September 15, 1999.

If you have any questions, please don't hesitate to call.

Sincerely,

Daron R. Haddock

Daron R. Haddock
Permit Supervisor

tm
Enclosure
cc: Paul Baker
Mike Suflita
Wayne Western
Price Field Office
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State of Utah
Division of Oil, Gas and Mining
Utah Coal Regulatory Program

Canyon Fuel Company, SUFCo Mine
150-Acre Incidental Boundary Change
ACT/041/002-IBC98(2)
August 20, 1999

# INTRODUCTION

This Technical Analysis (TA) is written as part of the permit review process. It documents the Findings that the Division has made to date regarding the application for a permit and is the basis for permitting decisions with regard to the application. The TA is broken down into logical section headings which comprise the necessary components of an application. Each section is analyzed and specific findings are then provided which indicate whether or not the application is in compliance with the requirements.

Often the technical review of an application finds that the application contains some deficiencies. The deficiencies are discussed in the body of the TA and are identified by a regulatory reference which describes the minimum requirements. In this Technical Analysis we have summarized the deficiencies at the beginning of the document to aid in responding to them.

It may be that not every topic or regulatory requirement is discussed in this version of the TA. Generally only those sections are analyzed that pertain to a particular permitting action. TA's may have been completed previously and the revised information has not altered the original findings. Those sections that are not discussed in this document are generally considered to be in compliance.

# SUMMARY OF DEFICIENCIES

## SUMMARY OF OUTSTANDING DEFICIENCIES

**R645-301-411.140,** The application needs to discuss archaeological site 42SV 2492 in relation to the requirements of R645-301-411.140.

**R645-301-330,** The application needs to include a plan to locate and photograph representative samples of vegetation growing in bedding planes and fractures on the walls of Box Canyon. This plan has been included in a draft submittal, but this need to be incorporated in the application.

**R645-301-731**, provide an updated Plate 7-3 showing monitoring point Pines 218, and monitoring of points Pines-407 and Pines-408 for at least five years.

# ADMINISTRATIVE INFORMATION

## RIGHT OF ENTRY

Regulatory Reference: R645-301-114

**Analysis:**

Page 1-34 has been modified to show an addition of 150 acres to lease U-63214. The lease was modified effective June 9, 1999. This portion of the application is considered adequate.

**Findings:**

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

# ENVIRONMENTAL RESOURCE INFORMATION

## HISTORIC AND ARCHAEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: R645-301-411

**Analysis:**

The application contains adequate cultural resources information. It includes cultural resources surveys for the Pines Lease Tract and a new survey for the 150-acre area. Four previously unidentified archaeological sites were found in the new survey. Three of these are considered significant, and two of the significant sites are rock shelters that could be damaged by subsidence.

Map 2 in the cultural resources survey appears to be in error compared with Plate 5-10 of the application. On Map 2, the western boundary of the IBC area is farther west than the boundary shown on Plate 5-10; therefore, sites 42SV 2493, 2494, and 2495 appear to actually be outside the IBC area rather than right on its border. Site 42SV 2492, however, is within the boundary, and it is a pristine site that is considered to have excellent research potential. Using a GPS unit, the applicant has confirmed this site is over the longwall panel.

The applicant has included cultural resources information from a previously-submitted application together with correspondence between the Forest Service, the State Historic Preservation Office, and the Advisory Council on Historic Preservation. This section is now in compliance with the baseline information requirements for cultural resource information.

Any report that would allow a person to locate any of the cultural resources must be kept confidential.

**Findings:**

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

## VEGETATION RESOURCE INFORMATION

Regulatory Reference: R645-301-321

**Analysis:**

The applicant has updated Plate 3-1 to show vegetation types in the area proposed to be added to the permit area. Most of this area is a sagebrush/grass community with some area of Douglas fir/spruce/ limber pine near Box Canyon.

The greatest potential effects on vegetation would be on riparian areas caused by water depletion. This is discussed under "Fish, Wildlife, and Vegetation Resource Protection" below.

**Findings:**

Information provided in the application is considered adequate to meet the requirements of this section of the regulations.

## FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: R645-301-322

**Analysis:**

**Wildlife Information**

Wildlife maps of the permit area, Plates 3-2 and 3-3, have been extended to include the proposed lease addition. There is no new information in the text.

Two golden eagle nests are in the vicinity of the area that would be mined, but it does not appear they could be affected by the mining operations. Also in this area is high priority elk summer range and high priority deer winter range. Neither of these is considered habitat of unusually high value as defined by the regulations.

All riparian areas and water sources are considered critical habitat, and the main potential effects on wildlife would be from water loss. However, no further wildlife information is required at this time.

**Threatened or Endangered Species**

The application includes updated information for the mining and reclamation plan about federally-listed threatened, endangered, proposed, and sensitive species. Although none of these species is known to occur within the incidental boundary change area, spotted bats, Link Trail columbines, flammulated owls, northern goshawks, and three-toed woodpeckers are know live in the vicinity.

The species most likely to be affected according to the Environmental Impact Statement is the Link Trail columbine. According to Bob Thompson of the Forest Service, there are two know populations of this species in Box Canyon. One is in the upper part of the left fork of the main fork of the canyon. The other is apparently lower in the canyon to the west of the 150-acre area. According to Mr. Thompson, this second population is not as well established as the one in the upper part of the canyon. A monitoring program for this species is discussed under the "Fish, Wildlife and Vegetation Resource Protection" portion of this analysis.

**Findings:**

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

## LAND USE RESOURCE INFORMATION

Regulatory Reference: R645-301-411

**Analysis:**

Plate 4-1 is a land use map, and it has been updated to show land uses in the area of the proposed addition. The land is used for grazing and nearby areas are used for limited timbering and grazing. Considering the nature of the proposed mining activities, the information provided is considered adequate.

**Findings:**

Information provided in the proposal is considered adequate to meet the requirements of this section of the regulations.

# OPERATION PLAN

## PROTECTION OF PUBLIC PARKS AND HISTORIC PLACES

Regulatory Reference: R645-301-411.140

**Analysis:**

The application needs to discuss archaeological site 42SV 2492 in relation to the requirements of R645-301-411.140. It should show whether damage from subsidence is likely. It also needs to describe coordination efforts with the State Historic Preservation Office and present evidence of clearances. Particularly is subsidence damage is likely, the application should show what will be done to prevent, minimize, or mitigate adverse impacts.

**Findings:**

Information provided in the proposal is not considered adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

**R645-301-411.140,** The application needs to discuss archaeological site 42SV 2492 in relation to the requirements of R645-301-411.140.

## SUBSIDENCE CONTROL PLAN

Regulatory Reference: R645-301-521, -301-525, -301-724

**Analysis:**

**Subsidence control plan.**

The Division reviewed the subsidence control plan and found it adequate. The Permittee will use an angle-of-draw of 15° to determine the maximum subsidence limit for the 150-acre IBC. The maximum angle-of-draw measured at the SUFCO over a longwall section is 15°. The

Division is confident that subsidence will not occur outside the subsidence boundaries shown on Plate 5-10.

**Findings:**

The Permittee met the minimum requirements of this section.

## FISH, WILDLIFE AND VEGETATION RESOURCE PROTECTION

Regulatory Reference: R645-301-330

**Analysis:**

Direct adverse effects to wildlife are highly unlikely since no surface disturbance is proposed and there are no known raptor nests above the proposed addition to the permit area.

The listed threatened or endangered fish of the Upper Colorado River basin would be affected mostly by water depletions. No net depletions beyond those presently occurring with operation of the mine area are expected to occur in mining the 150-acre area.

The proposed addition to the permit area contains few cliffs, and they are not large. Therefore, there is little chance of adversely affecting species that use the escarpments. Three-toed woodpeckers, goshawks, and flammulated owls use Ponderosa pines and other tree species in and near the area for roosting and nesting. However, it is unlikely trees would be affected. The EIS concluded that individuals of these species could possibly be affected but that there would be no significant effects to the populations or to the species.

The most likely effects would be a disruption of water supply to the creek and springs in Box Canyon. The proposal to longwall mine under Box Canyon includes studies of the hydrology and riparian vegetation of the Box Canyon area and analyses of potential effects of mining the area. It is possible there will be some interception of ground and surface water flows, but the exact effects are not known. According to the Mayo and Associates report, any disruption will probably be temporary, and inflow from springs on the sides of the canyon should provide at least some water downstream. The applicant will be monitoring water flows in the creek and some of the springs.

The applicant currently has a plan for monitoring the effects of subsidence on vegetation through taking color infrared photos every five years. Based on discussions with Forest Service personnel who work with remote sensing, it appears color infrared photographs will be more sensitive to changes in the vegetation composition and levels of stress than on-the-ground

surveys. This photography began in 1987, and, according to operator, has been done in 1991 and 1996. The applicant has committed to taking the photos at least every five years.

Ideally, the applicant should take color infrared photographs showing the entire lease modification area just before mining and again one and two years after mining. However, the existing photographs should provide adequate baseline information, and pictures taken again in 2001 would show long-term effects of the mining. The photography is not designed to detect effects that occur in a very short period, so waiting until 2001 is more likely to indicate what long-term changes might occur in the vegetation community. If there is drastic disruption of water flows or if marked changes are noted in the vegetation, it is possible additional monitoring will be needed.

The Forest Service and the Division are concerned about potential effects on vegetation growing in bedding planes and fractures on the walls of Box Canyon. Color infrared photography would detect large scale changes and stresses in the plant communities but probably not effects on small populations on the canyon walls. In a draft submittal received by fax August 16, 1999, the applicant included a commitment to locate representative populations of vegetation growing within bedding planes and fractures in the walls of Box Canyon. They would be recorded with a topographic map, and a GPS survey would verify the coordinates. Reports of the survey will be included in the annual report.

The commitments in the draft submittal are acceptable, but they need to be included in the actual application.

The Link Trail columbine is the most likely endangered, threatened, or sensitive species to be affected. The population at the top of Box Canyon would not be affected, but it is possible the population lower in the canyon could be affected if the water supply was disrupted. The applicant commits to locate populations of the columbine using a topographic map and global positioning system. Photographs will be taken during the survey. The Division understands through conversations with the applicant and with the applicant's consultant that this survey was done and that additional populations of this species were found.

**Findings:**

Information provided in the application is not considered adequate to meet the requirements of this section of the regulations. Prior to final approval, the applicant must supply the following in accordance with:

**R645-301-330,** The application needs to include a plan to locate and photograph representative samples of vegetation growing in bedding planes and fractures on

the walls of Box Canyon. This plan has been included in a draft submittal, but this need to be incorporated in the application.

## HYDROLOGIC INFORMATION

Regulatory Reference R645-301-731

**Analysis:**

**Basic Situation**

Several plates, such as 7-3, Hydrologic Monitoring Stations, show the 150-acre addition located at the northeast corner of the existing lease. A new water monitoring point, designated Pines-206, is added to the monitoring program. It's a spring in the Blackhawk formation and appears to be in the same location as a spring of the same number in the FEIS. This spring is located about 100 ft. below the canyon rim and 325 ft. above the canyon bottom and flows about three gallons per minute. It's just outside the area to be mined and is an appropriate choice for determining possible mining impact. Its protocol is quarterly discharge and water chemistry lab measurements typical for the rest of the monitoring plan. Additional monitoring is anticipated in the Pines Tract to the east if the mine is awarded that lease.

Possible hydrologic consequences of mining the 150 acres are described in an addition to Appendix 7-17, Probable Hydrologic Consequences, (PHC). This describes the Blackhawk formation underlying the Castlegate Sandstone which forms the rim and plateau above Box Canyon. The Upper Price River formation overlies the area to the east of the canyon and some portions of the 150-acre addition. Attachment A of the amendment includes Fig. 3-4 (a topographic map) and Table 3-1 from the FEIS. These show the location of several springs in Box Canyon and tabulate their origin according to geologic formation.

There are 12 springs which are potentially affected by mining the 150-acre area. Nine are in the Blackhawk Formation and three are in the Castlegate. According to the FEIS, three in the Blackhawk show seasonal flow variations. In addition to these springs, there are numerous smaller seeps which contribute to the base flow of Box Canyon Creek. According to the FEIS and USGS, springs are the primary source of base flow to the perennial stream in box Canyon with little base flow contribution from surface runoff. Also, "field observations indicate that much of the riparian vegetation of these stream reaches depends upon shallow subsurface waters issuing from the stream side colluvium rather than the in-channel surface flows themselves" (FEIS).

The submittal refers to the PHC included in the original MRP for a discussion of groundwater occurrence and recharge. These are believed to be the same in the 150-acre

addition. There is general agreement among the studies that the "recharge to the saturated zones is principally by snowmelt seeping into outcrops . . . Water movement is controlled mainly by fractures, dip of the beds, and hydraulic conductivity of the materials." Also the groundwater movement is regarded as relatively rapid (USGS). It's important to note that the length of Box Canyon Creek immediately to the west of the 150-acre addition has the "highest concentration of springs in the study area" and that "without exception springs in Box Canyon and East Fork Box Canyon issue from the east or northeast canyon wall. This is a result of structural control on groundwater flow (i.e., groundwater flow is in the downdip direction)." Further, "the potential for mining-related impacts to groundwater resources is greater in this area than in any other portion of the Project Area" (FEIS).

Using groundwater chemistry analysis, the recharge to the springs is believed to result primarily from flows in the Castlegate Sandstone as compared to the overlying Price River formation. This appears to indicate that recharge to the springs in Box Canyon is derived primarily from the area "within 100 feet to 1,000 feet of the canyon rims" (FEIS) and (MAYO). Using Plate 5-7, Upper Hiawatha Mine Plan, 5 Year Projection, the escarpment boundary was used to draw a line 1000 feet in from the canyon rim. This shows that slightly more than 50 percent of the area mined in the 150-acre addition lies within this recharge zone. A second chemical analysis "suggests that the recharge locations for groundwaters in the Castlegate Sandstone are different than the groundwaters in the Blackhawk formation, or that the groundwaters recharged under different climatic conditions." This appears to be inconclusive.

The substantial and unique environment in Box Canyon has been well documented and includes a perennial stream with mosses and ferns. The riparian area along the stream and area along the canyon walls is therefore designated as a critical wildlife habitat. Detailed evaluation of the plant and animal considerations can be found in the respective Technical Analysis.

At FEIS designated point 407, the stream flow has been measured quarterly for nearly two years and yet none of that information has been submitted to DOGM for inclusion into the Mining and Reclamation Plan (MRP). One set of flow measurements on October 29, 1997 showed 39 g.p.m. on Box Canyon Creek just above its confluence with the East Fork. The East Fork was flowing 20 g.p.m., and 81 g.p.m. were flowing at Lower Box Canyon (downstream near Muddy Creek) (FEIS). These numbers serve to show the order of magnitude of flows in the streams and the relative contributions of the streams. The MAYO study also showed that Box Canyon Creek was a gaining stream along its upper length. These data have not been submitted into the MRP either.

Monitoring point 090 is located due west of the proposed addition, just upstream from the center of the 150-acre addition. Review of ten samples of monitoring data submitted by the mine for this point shows an average flow over the last three and one-half years of 39.8 gallons per minute (coincidently, near the flow rate measured as described above). By way of comparison,

that's enough water to supply more than six households given the standard water allotment (0.015 cfs) for such purposes. In addition to contributing to the riparian resources, the flow is used by downstream water users, particularly on Muddy Creek which, per Darrel Leamaster, supplies the town of Emery with all of its culinary water.

**Overburden and Subsidence Cracking**

There is believed to be a definite disconnect between in-mine waters and near-surface groundwaters. This is substantiated by tritium analysis which shows the mine waters to be very old (greater that 7,000 years) as compared to meteoric waters that replenish the near surface waters (MAYO and FEIS). "The cause of this disconnect is attributed to shale and mudstones in the Blackhawk Formation that hinder the downward migration of water" (FEIS). As a result, "groundwater should not be diverted from the Castlegate Sandstone into the Blackhawk Formation" (FEIS). However, it's important to note that the Blackhawk Formation is interbedded and contains significant sandstone (60-65%) (MAYO) which can fracture and conduct water.

"The average mining height is 11.7 feet " (MAYO) and subsidence at the surface is expected to be in the range of three to four feet (Operator & AGAPITO). The ground slope in the recharge area is about 3 to 4% to the northwest and such subsidence would not be expected to result in ponding of surface runoff. The overburden, as indicated in Fig. 3-2 of the FEIS and examination of drill hole log 89-16-1, is a rather uniform depth of slightly more than 900 feet over the entire 150 acres. While this is a significant depth, surface subsidence cracking above the 150-acre addition is expected to occur since that has been documented at numerous locations above the SUFCO Mine with very similar geologic conditions and overburden (AGAPITO). The impact of this cracking has received considerable attention. Several cracks have been observed to have filled in with native soils washed in by natural runoff to the point that there is standing water over the cracks. Other locations have had a bentonite fill put in the cracks repeatedly with water losses still occurring. The FEIS indicates up to two years may be needed to fill cracks naturally. There still appears to be some inconsistency as to the impact of subsidence cracking and how effectively they can be sealed. This is reflected in the differing opinion of recognized professionals who have studied the issue (ROD). This issue is of particular concern on the 150-acre tract since the ground surface is bare sandstone and "soils are thin to nonexistent near the rim of Box Canyon" (AGAPITO). There is no soil cover to ameliorate the cracking.

The submitted plan has no provision for mitigation of possible cracking effects. Specifically, there is a stock pond in the northeast corner of the addition, designated West Pine, 202039 on Figure 3-17 of the FEIS, which could be impacted by the mining. Considerable problems have been encountered with stock ponds over other areas of the mine. Also, subsidence

cracks as wide as two feet have occurred in other areas of the mine and have had to be filled in. Commitments to mitigation must be included in this amendment.

Another concern regarding cracking is the possible increased speed of water transmission through the Castlegate Sandstone, which is already regarded as rapidly draining. This could result in loss of water to some of the springs later in the year and the stream no longer being perennial for affected reaches. Also, while the Castlegate Sandstone is presumably disconnected from the underlying Blackhawk Formation, this assumption is based on extrapolating from other areas of these formations to this particular location. This is reasonable, but it's possible that local conditions vary from this assumption. This could result in water flowing by gravity down through the Castlegate Sandstone and being diverted down into the Blackhawk Formation via newly formed cracks rather than flowing horizontally as it does now. The USGS report indicates this mechanism is probable. Some have speculated that groundwater which normally flows directly to Box Canyon could be diverted to other locations further down the canyon. All of these possible scenarios could result in groundwater being directed away from its traditional paths to the Box Canyon springs and being lost through subsurface cracks to previously unwatered regions.

Risk is difficult to quantify for geologic situations. However, based on all the above hydrologic considerations, it's believed that there's definitely some risk that mining the 150-acre tract could result in loss of groundwater flows to Box Canyon Creek during some seasons of the year.

**Regulatory Perspective**

The R645 regulations (R645-301-731) require that,

- "The plan will be specific to the local hydrologic conditions. It will contain the steps to be taken during coal mining and reclamation operations through bond release to minimize disturbance to the hydrologic balance within the permit and adjacent areas; to prevent material damage outside the permit area";

- "The plan will identify the surface water quantity and quality parameters to be monitored, sampling frequency and site locations. It will describe how these data may be used to determine the impacts of the operation upon the hydrologic balance":

- "The Division may require additional preventative, remedial or monitoring measures to assure that material damage to the hydrologic balance outside the permit area is prevented. Coal mining and reclamation operations that minimize water pollution and changes in flow will be used in preference to water treatment."

**Amendment Enhancements Needed**

As with all such operations, it's apparent that mining operations in the 150-acre addition to the lease will have some impact on the hydrologic regime. In order for the operation to receive approval, it will be necessary to establish that those impacts have been minimized and that material damage is not occurring outside the permit area.

The length of Box Canyon Creek that may be affected by mining the 150-acre addition lies entirely outside the expanded lease area. As indicated in the above regulations, the Division is obligated to be concerned with possible impacts outside the permit area. This is especially true in light of the significant scrutiny this project has received. Given the numerous hydrologic factors cited above, and the regulatory requirements, the Division has required the Applicant to provide additional information and additional monitoring before approval can be given. Many of these are derived from recommendations in the MAYO report, page 44. They will also serve as baseline monitoring for the Pines Tract Lease.

The Applicant has made the following additions to the monitoring plan. Some of them comply with Division requirements in the previous TA and others do not:

- Spring monitoring points number Pines-206, -209, and -212 have been added to Plate 7-3, Hydrologic Monitoring Stations. Table 7-2, Water Monitoring Program lists all of these, however, Pines 218 is also listed and does not appear on the map. Pines 218 is also referenced in the text and in tables of the new Appendix 7-17, Investigation of Surface and Groundwater Systems in the Vicinity of the SUFCO Mine, Sevier County, Utah: Probable Hydrologic Consequences of Coal Mining at the SUFCO Mine and Recommendations for Surface and Groundwater Monitoring. It appears Pines 218 was simply left off of Plate 7-3. In the previous Technical Analysis the Division required the Applicant to, "Submit all information previously gathered at all these (monitoring) points." This submittal contains that information in the above-referenced new appendix.

- In the previous TA the Division required the Applicant to, "Include FEIS stream monitoring points numbered 407 and 408 and submit all information previously gathered at these points." These points have been added and the information is included in the new Appendix 7-17. This appendix also contains a minor addition to the PHC that is quite similar to the basic PHC. The conditions at the 150 acre IBC are basically similar to the rest of the mine.

- In the previous TA the Division required the applicant to, "Perform a gain/loss flow rate survey (similar to that in MAYO, Figure 8) along the length of Box Canyon and along the East Fork of Box Canyon." After discussions with the Applicant, this was revised to include in the Water Monitoring Plan, monitoring points Pines-407 on Box Canyon Creek

and Pines-408 on the East Fork of Box Canyon. These are located near one another at the junction of the two streams. These points will be monitored for stream flows weekly during the months of June through October of 1999 and monthly during the months of July, August, September, and October starting in the year 2000. Flow measurements in the two streams will be taken on the same day and at least five days after the last precipitation event. This monitoring is described in Table 7-2, Water Monitoring Program and Table 7-3, Field and Laboratory Measurement Protocol and on page 7-45. The above agrees with the discussions between the Applicant and the Division. However, the submittal, page 7-45, indicates that, "Starting in the year 2000, sites 407 and 408 will be monitored once a month in July, August, September, and October *each year that mining is occurring in the Box Canyon area.*" (Italics added). This is not consistent with those discussions. The monitoring of Pines-407 and Pines-408 is to continue as an ongoing part of the water monitoring plan regardless of the location of mining. If analysis of the data shows no significant changes after several years, five years would be a minimum, the Applicant can then request a revision to the plan to reduce or eliminate monitoring at these points.

- In the previous TA the Division required the Applicant to, "Monitor the stock watering pond that is on the northeast corner of the 150-acre addition." After a field visit it was determined that the pond was unable to hold significant amounts of water due to sandy soils and the embankment being breached. As such, no monitoring is required at the pond.

- There was confusion regarding monitoring point 089 and the submittal clarifies the issue by designating 089 as a spring pool with depth measurements being reported by the applicant. This is clarified in Tables 7-2 and 7-3. The Division database has been updated to reflect this revision.

- Page 7-43 indicates the Applicant will age date test the underground water intercepted by mining operations to determine if it is of older or of meteoric origin. One sample will be taken as soon as possible after mining begins and another when mining is about half way through the 150-acre area. A map with the location of each sample taken will be submitted.

- In the previous TA the Division required the Applicant to, "Meter the water volumes pumped from the section of the mine in the 150-acre addition." The Applicant has explained that the dip of the mine will result in water draining into the 150 acre IBC and would not be pumped out. This renders the requirement a moot point and is no longer required by the Division.

The original MRP includes commitments to repair and mitigate possible damages done due to subsidence. These are described on pages 5-11, 5-21, and 5-33. Included are roads and ponds in the subsided area.

Several maps, including Plate 5-7, Upper Hiawatha Mine Plan, 5 Year Projection, have been revised to show no mining under upper Box Canyon in the existing permit area. These maps are consistent with the Record of Decision issued by the Forest Service which limited the areas available for mining.

**Findings:**

In its present form, the application does not meet regulatory requirements. Accordingly, the Applicant must address those deficiencies as found within this Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:

**R645-301-731**, provide an updated Plate 7-3 showing monitoring point Pines 218, and monitoring of points Pines-407 and Pines-408 for at least five years.

## MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: R645-301-301-512, -301-521, -301-542, -301-632, -301-731, -302-323

**Analysis:**

The Permittee modified Plate 5-1 "Previously Mined Areas," Plate 5-2C "Details of Portal Facilities," Plate 5-5 "Existing Surface and Subsurface Facilities and Features," Plate 5-6 "Land Ownership," Plate 5-7 "Upper Hiawatha Mine Plan 5 Year Projection," Plate 5-8 "Lower Hiawatha Mine Plan," and Plate 5-10 "Potential Subsidence Limits" to either update them with new information and/or to include the lease modification area. The Division reviewed the maps on December 21, 1998 and May 28, 1999 and found that they meet the minimum regulatory requirements.

**Findings:**

The Permittee met the minimum requirements of this section.